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ABSTRACT

This paper reviews the background of and compares three particular approaches to reflective professional development, specifically as used by Far West Laboratory: case methods, the Peer Assisted Leadership process, in which peer partners observe each other, conduct reflective interviews, construct leadership models, and explore alternate ways to handle dilemmas they face as school leaders; and teacher action research. It further describes how theory, data, and discussion are intertwined in each approach; what forms of knowing and reasoning emerge; and how these processes unfold in several specific examples. A distinctive characteristic of the approaches, as compared to their reflective processes, is the emphasis on in-depth consideration of real world experience or the documentation and interpretation of specific situations, here labeled as a focus on data. Discussion is a process tool by which participants articulate and reconsider interpretations of experience and try out and adjust different theoretical frames. By focusing on data or experience, many different forms of knowing and learning become relevant and useful, including propositional knowledge, narrative knowledge, and reflection through action. Each case is reviewed in terms of story, theory, action, question form, data/research, agency, and complexity. Appendixes include four examples of teacher research cases and an annotated bibliography of reflective professional development model literature. (Contains 49 references.) (Author/NAV)

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ANALYSIS OF REFLECTIVE PROFESSIONAL DEVELOPMENT MODELS

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ANALYSIS OF REFLECTIVE PROFESSIONAL DEVELOPMENT MODELS

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Abstract

New models of professional development emphasize the importance of collaborative reflection, of linking theory and experience in new ways, and of developing skills and dispositions that can guide ongoing learning from experience. In other words, they aim to develop professionals who can act wisely in complex situations of practice, not just transmit techniques or strategies. Far West Laboratory staff have been actively engaged in developing and studying such models. This paper reviews three particular approaches to reflective professional development—case methods, the Peer Assisted Leadership process, and teacher action research. Following background information on each approach, as used at the Laboratory, the paper focuses on a comparative analysis of the three approaches. A distinctive characteristic of these approaches, as compared to other reflective processes, is the emphasis on in-depth consideration of real world experience, the documentation and interpretation of specific situations, labeled here as a focus on data. Discussion is a process tool by which participants articulate and reconsider interpretations of experience, try out and adjust different theoretical frames. But this is a broadly encompassing process. By focusing on data or experience, many different forms of knowing and learning become relevant and useful, including propositional knowledge, narrative knowledge, and reflection through action. The paper describes how theory, data and discussion are intertwined in each of the approaches, what forms of knowing and reasoning emerge, and how these processes unfold in several specific examples.

Table of Contents

Reflective Professional Development Models.....2

Comparison of Models 8

Analysis of Examples 22

Appendix A: Examples of Teacher Research

Appendix B: Analysis of Reflective Professional Development Models

"Wisdom cannot be told."

"We do not learn from experience, we learn from thinking about our experience."

Over the past decade, views of professional development have shifted dramatically. In the 1970's, the predominant model was one of training. Teachers needed enhanced knowledge and skills; pre- or in-service staff development was designed to teach them those skills. Research evidence supported increasingly sophisticated training models. We disavowed one-shot workshops, but turned instead to a training sequence that should incorporate: a) diagnosing and prescribing, b) giving information and demonstrating, c) discussing application, d) practicing and giving feedback, and e) coaching (Sparks, 1983).

In the 1980's, the focus shifted to elements missing in training models: a professional's thinking and decision-making in uncertain situations of practice. Training models may work well for mastery of specific skills. What about larger issues of how teachers plan instruction, develop a repertoire of skills, and learn to use them appropriately in specific contexts? Expert teachers, we began to learn, had more complex and fully-developed schemata for understanding instructional events (Berliner, 1988). They had well-developed pedagogical content knowledge (Shulman, 1986), enabling them to recognize students' misconceptions and adjust instruction to capitalize on students' responses. None of these things were easily reduced to a training format.

A seminal work was Schön's (1983) book, *The Reflective Practitioner.* It described the kind of thinking process that an expert professional engages in to frame and solve problems in the uncertainty of the real world. The word "reflective" became popular and a variety of models and processes emerged for promoting teacher reflection (see Grimmett & Erickson, 1988; Clift, Houston & Pugach, 1990; Schön, 1987, 1991).

Far West Laboratory has been active in developing and researching such models. In particular, staff have worked with case discussions, case writing, reflective interviewing processes, and action research. The purpose of this paper is to step back from these efforts, at

the end of this contract period, and review some of what we've learned. Key questions include:

- What are the different reflective professional development models developed or used at FWL?
- What are the key features of the models, their similarities and differences?
- What outcomes are sought; what evidence is there of impact?
- What issues have emerged?

Reflective Professional Development Models

Case methods. Beginning with the publication of the *Mentor Teacher Casebook* in 1987, Far West Laboratory launched a line of work around case methods. A case is a narrative description of a real-life situation, a "slice of life," which can serve as the springboard for an interpretive, problem-solving discussion. The case captures the moment in a "freeze-frame" and allows extended reflection and discussion. You can get a feel for what a situation might be like, play out "what if's." It provides the "virtual world" that Schön (1983) writes about as a training ground in his examples, a chance to reflect "on action" or "for action" in preparation for reflection "in action."

The initial casebook was developed as a component of a preparation program for new mentor teachers, experienced teachers who would be helping newcomers to the profession. While mentors might receive guidelines for their role, or training in communication skills, or tips for establishing trust, they would have to act on such preparation in specific school contexts, with particular individuals, responding quickly to situations that came up. The cases gave them a glimpse of that real world, as revealed in narratives by mentor teachers about their experiences. Cases provided the chance to start from the real world context, try out different interpretations and approaches hypothetically, and learn from the ideas of others about the same situation.

Since 1987, FWL staff, in collaboration with others, have produced seven casebooks, along with numerous supporting documents and research articles. Meanwhile, the field of case methods has grown nationally and internationally, and FWL staff have been at the forefront, hosting annual conferences, traveling and speaking widely, and consulting with others on their work (Far West Laboratory, 1995).

Within the wider field of case methods, there are different schools of thought on how cases should be produced and used. For a review, see Sykes and Bird (1992). Against this backdrop, several features of FWL's approach are distinctive:

FWL cases are written by practitioners. While education faculty members sometimes craft their own cases designed to raise specific issues that fit with course content, FWL cases give voice to practitioners themselves. This is a value orientation related to the professionalization of teaching. It also brings us to consider case writing as a form of professional development (Shulman & Kepner, 1994).

Most of our cases center around a problem or difficulty and the writer's attempts to resolve it. This is the essential structure of the narrative form–stories have a plot and dramatic tension. There is something about the human brain that responds to, is perhaps even wired for, detecting and dealing with barriers to smooth action (Chafe, 1990; L. Shulman, in press). Often, the resolution to the problem is incomplete or not fully satisfying to the writer.[1]

Our cases are relatively complete descriptions of complex situations. They include a description of the setting, the thoughts and plans of the protagonist, a description of what occurred, a surprise or problem, further actions, and additional thoughts and reflections. In Barnett's math cases, examples of student work are included. It is particularly important that the writer's thoughts and reflections help frame the situation. Sometimes commentaries are written to accompany a case. These provide additional perspectives, reactions, or ways to think about the case.

We compile casebooks that contain multiple cases on related themes. The most deliberate compilation is Barnett's math casebook. She references the cognitive flexibility theory of Spiro and colleagues (1988). This theory posits that deep understanding and flexible application of concepts in messy, ill-structured domains of practice require "criss-crossing the landscape" and encountering basic concepts in different forms and contexts. Accordingly, she

[1] This feature is not absolute. For instance, practitioners sometimes want to tell (or read) success stories. The California Arts Project group began to distinguish between "testimonials" and "issue-oriented cases." This pull on their part seems to come from one or the other of two sources: 1) They want to use cases to show others that they are doing good things, or 2) They have a different underlying model of professional learning that emphasizes collecting possibilities for action.

organized a set of cases about the teaching and learning of fraction/ratio/decimal/percent, within which a number of fundamental issues surface repeatedly.[2]

In addition to these features of the case materials themselves, there is a certain character to a case discussion advocated by FWL. It is a discussion, by Webster's definition of "open and informal debate." It is lively interaction among the participants, with minimal but strategic guidance by a facilitator.[3] The facilitator seeks to expand and deepen the discussion, as well as to encourage active participation. But the discussion belongs to the group. Participants speak directly to each other, not through the moderator. They ask questions as well as offer points of view. They take responsibility for what happens.

Barnett and her colleagues have developed not only a case discussion process but also a format for use. Math case discussion groups typically meet for six or more case discussion sessions spaced out over several months. Care is taken to develop a discussion community with supporting norms, and substantive issues can be addressed over repeated discussions. This long-term character of the process is seen as critical (Barnett & Friedman, 1995).

With other casebooks, however, format and context of case discussions have not been so standardized. Often case development was done collaboratively with partners who had their own contexts of use. These might involve using cases within coursework, in workshop settings, or in short-term case discussion groups. While we conduct facilitation seminars and provide written case notes to assist facilitators, formats of use have varied widely.

Peer-assisted leadership. A second example of reflective professional development at FWL is the Peer-Assisted Leadership (PAL) program. This is a professional development process for principals in which peer partners observe one another, conduct reflective interviews, construct leadership models, and explore alternate ways to handle dilemmas they

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[2] But this deep structure of the casebook is purposefully not an explicit framework. Issues were identified during field testing rather than driving the case writing itself (Barnett, 1991). Cases are not grouped in sections according to central issues. In part this is because any one case raises many issues. In part it reflects dilemmas we should study further about how to link theory with cases.

[3] There are different patterns of discussion and facilitation. In Barnett's method, the process begins with identifying the facts in the case, then "issues in the form of a question." Using these facts and issues as common background, the group decides where to begin, continue and end the discussion. The facilitator extends and deepens the discussion in subtle ways, by comments and questions, to "pull out" ideas or "push" peoples' thinking, even by playing devil's advocate, so that more possibilities are considered, and more fully. (See Barnett and Friedman, 1995, for further details.) There are variations on this theme and the process keeps evolving. J. Shulman is now working with ways to move participants more toward identifying principles, what this is a "case of."

face as school leaders. The overall process consists of six sessions spread over the school year; these meetings guide work done between sessions. The process incorporates a conceptual framework of leadership that emerged in a prior ethnographic study of school principals conducted at FWL in the early 1980's (Dwyer et al, 1985). In fact, both the methods and the framework were derived and adapted from that earlier study. An early publication described the process as "principals creating case studies" (B. Barnett, 1986).

The core of the reflective process is in the field work between partners. Each takes a turn to "shadow" the other and use the observation data to conduct a reflective interview. In the interview, the data are reflected back by the observer (like holding up a mirror) and questions are asked to "create opportunities for individuals to reflect aloud, to be heard by one or more colleagues, and to be prompted to expand and extend thinking through follow-up questions." (Lee & Barnett, 1994). Typical reflective questions include clarifying questions, purpose/consequence questions, and linking questions that allow the respondent to examine his/her beliefs, intentions, and theories of action.

This reflective work by partners is embedded in the larger process, which offers additional opportunities for reflection. Participants learn specific techniques for observation and feedback through modeling and guided practice. They analyze early data to develop an understanding of "themes" in their partners' practice, and use these themes to guide later observation and reflective questioning. They develop graphic models of their partners' leadership frameworks. These activities are shared and discussed in the larger group, where they stimulate conversation about leadership roles and behavior.

This basic PAL process has been used with numerous groups from 1986 to the present. There is a facilitator preparation program, with certified PAL facilitators now located in many states and abroad. Adaptations of several sorts have been created to fit the requirements of different groups. In particular, the observation and reflective questioning processes have been lifted and applied in other contexts.

Teacher research. If the PAL work can be seen as more monolithic and fully developed than the case methods work, which we described as diverse but with some common threads, then the teacher research work that is less so. Within the OERI work, there is no distinctive model of teacher research that has been developed and disseminated. Instead,

drawing on a knowledge of the theoretical and practical literature, we have worked with a variety of different professional development groups to help them incorporate teacher research components. We will describe briefly the different projects and the approach to teacher research they incorporate. We will also include in this review a separate project in science education where a teacher research process was developed and facilitated by FWL staff.

In teacher research projects, teachers become active learners and inquirers about their own practice in the classroom. They start, typically, with a problem, a frustration, a rough spot, or sometimes just a wondering. They problem-solve, frame research questions, and identify actions to take in the classroom. Then they look hard at classroom events and student responses. They collect and analyze data, try to understand the student's perspective, reflect and make sense of what's happened. This process is generally supported by participation in a research group, where they talk about their projects, clarify their thinking, learn research techniques, and gain support.

One FWL project was with the California Alliance for Elementary Education, which supports networks of schools around the state that are interested in serious pursuit of elementary reform. Leadership teams from each of these regions attended a symposium on teacher research that was designed, in part, by Far West staff. We also produced a *Proceedings* of the event, which was the stimulus for subsequent teacher research activities in individual regions.

The model that several regions implemented was the collaborative action research approach as formulated and facilitated by Richard Sagor (1992). In this approach, teams of teachers from a single school work together on a topic or project of mutual interest. Teams from several sites meet together several times during the year for training and guidance in the research process. At the first session, they develop a problem statement, a graphic representation (flow chart) of what they think is happening (including any proposed intervention), and a specific list of research questions. At the second session, they plan data collection techniques to incorporate multiple data sources for each question. At the final session, they share what they have learned with one another. This approach was used by several regions, often with the training sessions facilitated directly by Dr. Sagor. It also provided a model for later work by FWL staff with teachers in the California Science Implementation Network.

A second approach to teacher research is exemplified in a project with two school districts in Arizona. For the past several years, FWL staff have been working with middle

school teachers in Tempe and Scottsdale to help them learn a particular approach to curriculum and instruction called "Complex Instruction." In the winter and spring of 1995, 14 Complex Instruction teachers from the two districts formed a teacher research group to investigate aspects of the program and its impact on their students. An initial half-day session, conducted by a FWL staff member and the C.I. coordinator in Scottsdale, introduced the teachers to classroom inquiry methods and helped them identify specific questions of interest. Mid-project afternoon sharing sessions were held separately in the two districts. Teachers came back together in June to share their projects, data, and insights with each other.

Because of the timing late in the school year, when most of the Complex Instruction units had already been completed, teachers tended to focus on investigating the impact of the program on students. One teacher surveyed students and shared the results of that survey; other teachers then developed their own surveys and reported at the final session. They surveyed their students on issues such as their perceptions of abilities needed in the classroom, the use of rubrics for assessment, their understanding of subject matter, and their views about groupwork. What they found out helped them plan instruction the following year.

The final teacher research project included here is the Life Lab project (Daehler, 1994). This was the most intensive research project of the three. With outside funding through the National Center for Science Teaching and Learning, FWL staff worked with seven elementary teachers from four different schools, all of whom wanted to take a critical look at their science teaching and were in their first year of implementing *Life Lab*, an integrated garden-based science curriculum. During this full-year project, the teachers met for five full-day "how-to" seminars on research methods. The project director also met monthly with the teacher-researchers at their school sites, both individually and in small groups. After the school year was over, the teachers met to write up their research projects, which were published in the volume *Teacher Action Research: Learning with Life Lab: Reports from the Field, 1993-1994* (Daehler, 1994).

See Appendix A for synopses of several teacher research projects, which will be discussed in detail later in this paper.

Comparison of Models

The previous section provided specific detail about three approaches to reflective professional development featured in FWL work—case methods, PAL, and teacher research. Now we want to step back from these specifics and analyze their "deep structure," to use a term from linguistics. What are the core components, the underlying models of learning? In what ways are these three approaches similar, a distinctive type within the larger population of reflective professional development approaches? How are they different from each other, and what is the significance of those differences?

Models of reflective professional development can be analyzed in terms of three basic components, as shown in Figure 1 below: concepts or theory, data, and discussion. "Concepts or theory" refers to concepts in the literature by which people have tried to understand teaching and learning–the propositional knowledge base in our field. "Data" are selected elements of real world experience of two sorts: from one's own experience base, for instance, with trying something out in the classroom; or data can be accounts of someone else's experience, for instance, a case narrative. "Discussion" means talking with others about one's views and experiences. It represents communication with an audience of professional colleagues.

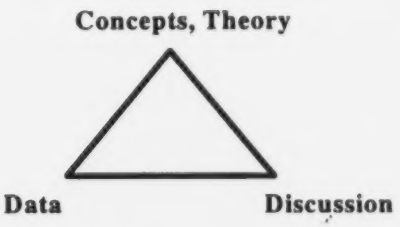

Figure 1

These three components are, we submit, central to the reflective learning process. "Theory" and "data" set up the dichotomy between abstract knowledge and real world specificity that is a central tension in education. We talk about the ivory tower vs. the real world, about bridging the gap between theory and practice, about school smarts vs. street smarts, about learning to walk our talk. Such phrases call attention to differences or

disconnections between cognitive domains. The question is how to connect them, and particularly how to connect them so as to enable wiser action in the real world.

So, it will be important to see how theory and data are incorporated within reflective professional development processes. What is included? By what processes are they interconnected? What sequencing is involved? And a core aspect of the process, anchoring and connecting the other two, is discussion. Through verbalization and interaction, ideas are formulated and reformulated, assumptions are brought to consciousness, collaborative reflection takes place. Discussion is the medium through which much of the learning occurs. Dissecting the specifics of the discussion process is beyond the scope of this paper, but we do want to look at where and how discussion is used within the overall process.

One common reflective professional development approach to contextualizing learning emphasizes the theory-discussion dimension of the triangle. For instance, an increasingly common element of workshops is "processing time", when participants are asked to talk or work together in some way in response to information that has been presented. Often the processing has to do with application of the ideas, the "so what" section of the agenda. People might talk about what the ideas mean to them, how they see something fitting into their own situation, what related experience they have had in the past, how they could apply the ideas, etc. Certainly experience is brought to bear, but usually this is done informally, through whatever comes to mind and is shared in the discussion.

A more extended version of the same basic model, emphasizing theory and discussion, is the "study group" (Murphy, 1994). Here a group of people meet over time to study an issue or topic in depth. They might read a series of articles or bring in speakers, and try to apply these insights to their own situation. Dave Berliner and others have organized packets of research readings around topics of frequent concern to teachers, such as class size, to be used as the basis for such study groups.

The Far West Laboratory models presented above are all of a different sort. In particular, the data/experience corner of the triangle, which is informally invoked through the discussion in the study group process, is *more explicitly present, even central* to our models. Case methods center around written reports of specific events. PAL reflective interviewing is based on observed behavior. Teacher research involves systematic study of practice.

This emphasis on data/experience turns out to be a profound reorientation or reframing of the entire process. If we start with theory, and ask how can this help us understand practice, then we have limited the focus of our inquiry, moving from the known to the unknown, from the general to the specific. *If we start with the data, the process is reversed.* We start with the more complex, multi-faceted whole, and try to make sense of it. We apply different lenses or theories, but without losing sight of the wholeness or specificity of the real world situation.

This difference is depicted graphically in Figure 2 below. Any event, action or experience in the real world can be conceptualized in a number of ways, shown as spikes around the circle. If we are working from theory to practice, the question is how the concepts or theories in dimension A map onto the experience. Do they apply and how? This is profitable discussion, both for how it can illuminate practice and how it can refine our understanding of the theory. But it is only part of what comes into play in considering the experience itself.

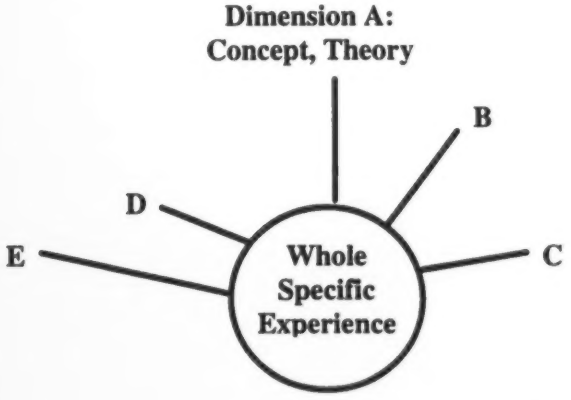

Figure 2

Consider, for instance, scholars who point out different dimensions that are relevant and need to be taken into account in managing school improvement efforts. Berman (1982) identifies political, cultural, and technical dimensions. And the point here is that any one event has meaning simultaneously along these several dimensions. Closer to the classroom, teachers have to think simultaneously about the significance of an action for the learning of an individual child, the development of curriculum content, and the management of behavior.

But even beyond these content examples, starting from real world experience opens up different ways of thinking, reasoning, and holding knowledge. The multiple frames of reference that we can bring to bear in interpreting experience go beyond different abstract

theories to different kinds of knowledge, perhaps related to Gardner's (1983) multiple intelligences, but perhaps not accounted for fully even there.

Because this point about different ways of thinking is so important, and is evoked by the focus on data/experience which is characteristic of all three FWL models, we want to elaborate on it before we return to a contrasting of the different FWL models. In particular, we delve more deeply into several different forms of knowing, and also what it means to learn from experience, and the kind of knowledge that is entailed in "reflection in action." Once these themes are explored, we return to a comparison of models and some specific examples in which these themes play out.

Forms of knowing. In our culture, considerable status is attached to objective, scientific knowledge. One of our distinctive achievements as humans is our capacity to invent symbol systems that represent and explain patterns in the messiness of the real world. We are designed to find such patterns. Even the most basic uses of language and our ability to communicate with each other depend on pattern perception that can be shared between people. Children learn from a bewildering array of examples a common meaning of "cup" or "family." Thinkers, over decades, have invented the disciplines of science, or history, or mathematics, each with a way of determining and describing patterns. But these formal modes of knowing all involve abstraction from the real world, generalization across variability. They represent a kind of detached knowledge which is only one way of knowing about the world.

Ryle (1949) distinguished between "knowing that" and "knowing how." Teachers, like other professionals, need to take action. They need to know how. Cases as representations of action provide a vicarious experience of action. And the information that teachers take in and remember is of a different sort from knowledge of abstract principles.[4]

A number of people are trying to understand and describe these different forms of knowing, especially for teachers. Bruner (1985, 1986, 1990) posits that there are two fundamental modes of knowing: "paradigmatic" and "narrative." The paradigmatic mode is logical-scientific. It involves "good theory, tight analysis, logical proof, and empirical

[4] Notice that we have raised here the fundamental epistemological issue of the nature of human knowledge. How do we move from the blur of experience to the recognition of patterns, to the use of language and labeling, which automatically implies abstraction and concept formation? What is the role of language?

discovery grounded by reasoned hypothesis" (1985, p. 98). It looks for universals abstracted from the variability that exists in the real world. But such abstraction necessarily simplifies and leaves things out. "Narrative knowing" is grounded in the specific. It involves a particular story of something that happened, over time. And the narrative or story structure carries with it other key features (Bruner; Chafe, 1990; L. Shulman, in press). It involves human consciousness and intention, often thwarted by obstacles that must be overcome. Stories have characters, with whom we identify, and a plot with dramatic tension. Thus, when we read a story we experience "a way of being in the world," and we remember and store the experience in the narrative mode.

There are echoes of the paradigmatic-narrative distinction in the writing of those who try to describe the knowledge held by expert teachers (e.g., Leinhardt, 1990). These people use terms like "craft knowledge" or the "wisdom of practice" to describe what good teachers know. Often, this knowledge base is tied to actions, and complex structures of actions in the classroom. Doyle (1990) says that teachers' knowledge is "event-based," organized around tasks and the accomplishment of tasks. And this kind of knowledge is particularistic:

> There exists a natural tension between general, subject-based, principled knowledge in a discipline and the specific, eclectic, particular knowledge acquired in the practice of a related craft. Teachers as both professionals and practitioners are caught up in this tension. Their professional training in institutions of higher learning emphasizes theory as an efficient, universal, cohesive truth filter for disorganized, practical experience.... However, teachers also appear to learn in their profession and to communicate with their colleagues and others in the language of craft and practice–in fact, in the language of the particular. (Leinhardt, 1990, p. 18)

So, by this distinction, narrative knowledge is of a different sort, one closely related to the way teachers think about practice. Moreover, according to L. Shulman (1986), cases, in the narrative form, can serve as a basis for accumulated knowledge and reasoning. A case can be a "precedent," for instance, an example that can be referred to for comparison or guidance for future action. Casuistry is a form of logic in which moral reasoning is based on cases. See Sykes and Bird (1992) for further description.

But Shulman also insists that a case should be explored as a case "of" something. This moves us from the purely narrative mode into exploration of the key concepts or principles that are relevant to understanding the case (and for which the case can help us understand the

concepts or principles).[5] This is important. It means that we should recognize different modes of knowing, but also look at their interconnections. Narrative is, after all, language. To describe someone as an "at risk" student is to make a theoretical claim, to evoke a concept by which people communicate across the variability of specific experiences. Part of the work in writing a case, or in discussing one, is to debate the underlying or explicit concepts that are brought to bear.

Spiro's cognitive flexibility theory also emphasizes this interconnection of modes of knowing. We mentioned above that his theory underlies the design of Barnett's math case methods approach. Here we want to look more closely at how he deals with forms of knowing and the kind of understanding he is trying to produce. Spiro and colleagues (1988) distinguish between the aims of introductory learning–recognition and recall–and those of advanced learning, where learners must "attain a deeper understanding of content material, reason with it, and apply it flexibly in diverse contexts." They are especially concerned with advanced understanding in "ill-structured domains" of complexity and uncertainty, such as medicine or education.

One problem, they find, is that introductory learning oversimplifies. No situation can be understood by a single concept; no concept shows up the same way in all cases. That's the definition of an "ill-structured domain" in the real world. To act successfully in such circumstances, one must have multiple, differentiated, and interconnected mental models. And these must be held not as one complex, monolithic structure but as multiple, recombinable components that can be brought to bear on a specific case. We need many ways of thinking about something, and the capacity to bring them to mind at the appropriate times.

One representational form that they use is metaphor. They describe, for instance, how the way muscles work can be understood as something like rowing, but also something like a turnbuckle and something like Chinese finger cuffs. Multiple metaphors are needed to compensate for the limitations of any single one. Others are also investigating metaphor as a form of knowing.

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[5] Some people advocate the use of cases as examples of theoretical concepts. Doyle (1990) calls this "precept and practice." Sykes and Bird (1992) call this the "cases as instances of theory" usage. They also cite those who specify the selection of cases that are positive exemplars of a concept, samples of expert lessons, models (Berliner, 1988; Leinhardt, 1990).

In their theory and research, this means that advanced learning requires both concepts and cases. The messier and more ill-structured a domain, by definition, the less clear-cut it becomes to apply general principles to a case, and the more important it becomes to reason from precedent cases. But the precedent cases have meaning, in part, through their connection to concepts:

> Our programs neither neglect cases to teach concepts, nor concepts to teach cases–both are taught in the context of the other. Learning is situated but abstract knowledge is not ignored. Our approach teaches concepts and cases simultaneously, not separately: concepts-in-practice. (Spiro & Jehng, 1990, p. 199)

Learning from experience. It may be clear by now that this kind of advanced knowledge is never complete. It is not possible to understand it all, or get it all right. There is always the next case to deal with, to recombine, reapply, and refine knowledge. The enduring task of a professional in the real world is problem solving. Or, more accurately, problem framing–deciding how to think about a specific situation–acting based on that definition, and evaluating the results of the action.

Some uses of cases aim for the development of problem solving ability (see Sykes & Bird, 1992). Learning to "think like a teacher" means not just knowledge, of whatever form, but the process of thinking through situations of practice. Such thinking is dynamic, not static. And the goal is for teachers not only to reason more thoughtfully in a particular situation but to use repeated experience to develop the more complete knowledge base to which Spiro aspires.

But the notion of learning from experience requires us to examine yet again the fundamental issue of how we know something. Above, under forms of knowing, we contrasted abstract, paradigmatic knowledge with narrative or event-based knowledge, especially as represented by cases. But cases are themselves a kind of abstraction from direct experience. Shulman, for instance, teaches preservice teachers to write cases in part so that they can "chunk" experience, pull out a part of it, and hold it in mind for reflection. Verbalization is a kind of distancing. There may be another kind of knowledge that more fully incorporates the direct experience of action, and that is learned through experience.

Schön popularized the phrase "the reflective practitioner." What he described was the close interconnection between reflection and action. Spiro, as well, talks about "knowledge in action." And certainly this idea goes back to Dewey, who used the term "transactional knowledge."

The practitioner is an actor, subject to the requirement to act quickly, in real time. The purpose of knowledge is not for its own sake but to enable action. Knowledge is refined through action, in successive steps, shaped by feedback and governed by practical criteria of "what's good enough."

Schön analyzes several examples of expert practitioners reflecting in action, for example, an architect helping a student work on a design for a school building or a therapist talking with a student-therapist about a case. In both of these situations, there is time to reflect; the actor is not on-line as a teacher is while teaching (or a therapist while with a patient). This kind of stepping back to a "virtual world" provides an opportunity for extended reflection. But the nature of the reflection is closely tied to action.

In dealing with the problematic situation, the expert "imposes a frame (on the situation) and plays it out" in a thought experiment. He says "what if" we start the design this way, or "what if" we interpret the patient's behavior as transference? Then, what would we do next? What other information do we have and how does it fit? Schön calls this a "reflective conversation" with the situation, and the situation "talks back." The expert must impose the interpretive frame, but then treat it as an experiment, and be open to feedback from the situation. He asks not only "Do I get what I want?" but also "Do I like what I get?"–a broader set of both intended and unintended consequences. In imposing a frame, the expert draws on a repertoire of "examples, images, understandings and actions" which he perceptually fits to the situation, "seeing it as," then articulates and plays out. According to Schön: "the process spirals through stages of appreciation, action, reappreciation."

Cognition and affect. One important consequence of this broadening of our conception of "knowing" to include multiple forms of knowing or modes of representation is to take us beyond the narrowly cognitive. Just as science is supposed to be objective, "knowing" is usually taken as a cognitive activity, based on information and logic. But we have seen that narrative forms involve intention and consciousness, human will and morality. We can vicariously experience the actions and feelings of the characters. Knowing through action carries distinctive aspects of perception and awareness.

Working outward from experience, then, brings human emotions and values into play. For some, this is necessary and critically important to promoting deep and meaningful

professional growth. Human action depends not just on ideas but on will, a sense of efficacy and agency, a moral purpose that energizes. Fullan (1993) finds the moral purpose of teachers, their desire to make a difference, the fundamental building block of change. Weisglass (1992) emphasizes the need to recognize unarticulated beliefs and values, and deal with feelings and attitudes, as part of the change process, and he designs professional growth models that incorporate these elements. Change will occur, he says, "in the context of identifying and discussing values and beliefs about all school practices, listening to and grappling with views that are different than our own, and working through feelings and attitudes that inhibit change." Reflective professional development models that build from experience provide an opportunity for this to happen.

Simultaneity. The preceding sections present an array of different models for how people know, remember, and learn. It is important, before we go on, to emphasize that these can, and must, co-exist. We are not trying to find the right one, or even the one that fits our data best. That's part of the problem in understanding complex concepts in the real world: we look for the one best way, when multiple, partial, and evolving answers are more appropriate. Like Spiro's muscles analogies, teacher learning is something like abstract principles and something like stories and something like representations of action, or aspects of all of them simultaneously. The question is in what ways, and how are they interconnected.

Back to the models. The preceding sections spun out from a focus on the "data" corner of the triangle model presented on page 8. To recap, we said that reflective professional development models could be distinguished by the ways in which they incorporated the components of theory, data, and discussion. We contrasted study group models, which emphasize theory and discussion, with the FWL family of models, which emphasize dealing directly with data or experience. We then elaborated on the broader set of forms of knowing, and range of cognitive, affective, even kinesthetic registers, that are brought into play by working from a more holistic experience. Now, we want to go back to the triangle model to distinguish among the FWL models in terms of how they incorporate the corners of the triangle.

Case methods center around group discussion of a written account of experience. Details of the situation are analyzed as members of the group bring their different perspectives to bear on understanding what's happening in the case, how to think about the problem(s) and their potential solution.

Teachers make sense of the case, in part, by relating it to their own situations and experiences. A good case is seen as one that is believable, meaning that others resonate to it, and find that it feels familiar. They often share related anecdotes when discussing the case or arguing for a particular interpretation. Thus, their own experience serves as "precedent," as well as earlier cases serving as memorable exemplars in later discussions.

In the extended math discussion groups, Barnett also found that teachers took the case situations back to their own classrooms, and tested things out with their own students. Would their students respond in the same way as students in the case? What would happen if they tried a particular instructional approach? Thus, they were driven by the open-ended discussions to seek verification and validation in their direct experience, a process labeled "informed, strategic inquiry" (Barnett & Tyson, 1993). We will come back to this point in the example in the next section.

Theory is brought into case discussions in several ways. Largely, it is brought in through the assumptions and practical theories of the case writer and case discussants as they articulate their arguments. One role of the case facilitator is to draw out this thinking, to encourage people to articulate their thinking more fully and explicitly. Sometimes this involves "moving up and down the ladder of abstraction," asking people both for concrete specifics but also to generalize, to think about what concepts or principles this is a "case of."

While these aspects of case discussion are probably present in most discussions, those who use case methods differ in the broader curriculum within which they fit cases, and therefore in the ways theory is explicitly brought to bear. Some professors in education courses, having particular content to cover, use cases deliberately to illustrate, or raise discussion of the application of, specific concepts or theories. Some even plan mini-lectures to provide information when it is needed within the case discussion. Their primary goal is to tie abstract learning to the complexities of real world application.

FWL cases are not so explicitly tied to theory. This is a deliberate choice. Our broad goals are to give voice to practitioners, who write these cases, to allow others to share in and learn from the experience, and to build a more active, professional stance toward learning and knowledge. Within the field of case methods, our approach is closest to those who emphasize using cases to develop problem-solving skills or habits of thought among teachers. But it goes

beyond this. Barnett, in particular, has emphasized breaking away from the expert vs. practitioner role differential. The case facilitator is not "the expert"; the group is responsible for the discussion. She writes about "shared authority to increase teacher autonomy." Again, we will return to this theme in the example which follows.

But this does not mean that there is no attention to the conceptual deep structure of the cases, their theoretical potential. Case writers are prompted, more or less successfully, to write to key issues or problems in the casebook domain, for instance, engaging student participation during groupwork. Barnett's cases all focus on specific math content, and have a set of underlying issues woven through (Barnett, 1991). Commentaries are sometimes written and included with the case to raise specific perspectives for consideration. References to outside reading may be given. A guidebook and case notes are available to case facilitators to help them recognize and prepare to discuss specific issues.

In the *Peer-Assisted Leadership* process, the relationship among data, theory and discussion is different from that for case methods. Here, all three corners of the triangle are explicitly incorporated and integrated. Data are actual observations by the peer partner. Discussion of the data takes place in the dyad, as the observer reflects back the data and prompts the partner to explain his thinking about particular events.[6] The goal is not only to consider different possibilities or points of view but also to help the person articulate and clarify existing mental models, or possibly reflect on the connection between stated beliefs and observed practices.

Moreover, these data are interpreted and organized by the observer, who is working over time to develop a more complete and accurate picture of the partner's mental model. Guided by a heuristic framework of leadership behavior, PAL participants develop simple flow charts depicting the principal's avenues of influence. They convert the generic framework to more specific elements and patterns in their partner's unique model. Thus, an explicit, but quite general, theoretical frame is part of the process, and the link between that theory and observed

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[6] Contrast this kind of reflective interview with other forms commonly in use. Often the interview is disconnected from observed data, more like a counseling format, a dialogue between a speaker and a listener. The emphasis is more on the speakers' thoughts and feelings than on evidence or facts. In the extreme, the listener is sometimes even asked not to speak at all, but be silently attentive and let the person work out his thoughts by speaking. In contrast to these usages, PAL is firmly routed in observed data.

data is a key focus of the inquiry. These frameworks and inquiry elements are shared and discussed in the larger groups.

Teacher research projects have yet another pattern, or family of patterns. At its core, teacher research involves intensive examination of data, from one's own setting, by oneself. In the triangle, this is largely the data-theory dimension. Some people argue that teachers do research all the time, every time they act–and learn from their action. To be reflective about practice, at its most basic, means expanding this reflective activity, allowing (or making) time for reflection, more consciously verbalizing what is being learned, perhaps capturing it in writing, for instance, in a journal. Reflection means "going meta," bring to consciousness processes that may go on half-consciously. This description appears close to Schön's "reflection in/on action."

But notice that we have jumped, here, from the word "research" to the word "reflection." There are a variety of terms in the field among this family of inquiry processes: teacher research, classroom inquiry, action research, reflective practice, etc. Richardson (1994) uses the term "practical inquiry" when she distinguishes "formal research," intended to contribute to the knowledge base of the larger scholarly community, and "practical inquiry," undertaken by practitioners to improve their own practice. Indeed, all of these related approaches emphasize that the greater understanding and knowledge produced by the inquiry should have direct use and application. Action research, for example, is "inquiry into a situation in order to change it."

While these approaches share a focus on local inquiry for action, the variety of terms are evidence of different approaches to the nature and process of inquiry. They all provide some structure, some greater degree of deliberate, systematic reflection than on-the-spot experiment. But there is certainly no systemization. Actually, the same can be said of more formal research, where recent decades have seen a widening array of acceptable research methods. We need to look at how these research traditions apply to classroom inquiry, and how they speak to the connection between theory and data.

For some, classroom inquiry is best seen as qualitative research. Certainly it is localized, generally about one specific situation, a form of case study.[7] But qualitative

[7] It's interesting to consider the multiple uses of the word "case." Here we encounter the term "case study," a distinct research form and tradition. But Dyson (1995), in writing about her case studies of children, presents them as "cases," instances of "bounded complexity," cases of something. How is this research tradition different from teacher-written cases used in case methods? Of what

research itself is defined in different ways. Erickson (1986) prefers the term "interpretive" research. The point, he says, is not words versus numbers, but the intent of anthropological approaches to understand the meanings of actors in a situation, how they make sense of the world. Who else is better equipped than the teacher to be a participant observer, if there are some ways to ensure open-mindedness and triangulation? Much teacher research is of this sort. In particular, teachers have focused investigations on understanding students better. Through observation and questioning, they have gotten a better idea of their students' thoughts and feelings, and used this insight to guide their instruction. Sometimes they have even made students co-investigators into classroom phenomena.

Where is the theory in this kind of research? It is in the interpretive frame that is used. While descriptive or interpretive research is intended to explore the world view and experiences of people in the situation, it necessarily does this around some themes or concepts the researcher uses to focus the inquiry. Dyson (1994) gives a fascinating account of how her case studies of children learning literacy changed in focus over a decade as her frame of reference, and that of the larger research community, evolved. (She also notes how the study of the child reveals the limitations of any one frame, and how loose ends help push the evolution of the theory.) Similarly, teachers bring to bear their explanatory frames. And, like Dyson, these are often shaped by readings or other access to the larger world of educational ideas. A good example is in the area of research on writing, where teacher research groups tend to include regular reading and discussion of research articles as part of the process (Mohr and MacLean, 1987). And the published writings of teacher researchers are an important part of this research tradition.

But not all classroom inquiry is of this sort. Much of it places greater emphasis on the teacher's actions within the situation. Prototypic questions are "How can I get my students to....?" Or "what would happen if I tried.....?" These are variants on what Schön sees as the essential question in reflective practice: "What if...?" ("Will I get what I want; will I like what I get?")

Sagor has an interesting variant on this approach. He emphasizes having participants (usually school groups) focus on a problem, write a problem statement, and even develop a

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import is the insider vs. outsider role? Can one write a case study in which one is an actor? What are the differences in process and how might they be important?

"graphic reconstruction." The latter lays out in a kind of flow chart what the presumed factors are, and how they interrelate, including what the teacher does and what the students do. Potential actions to solve the problem, to intervene in the sequence of events, are added to the diagram with dotted lines. This visual, and the underlying problem statement, serve as a base for identifying research questions.

Within this domain of action-focused inquiry, the questions tend to look more like those in the quantitative tradition. They are propositions to be tested: "Will students learn more in untracked classes?" or "Will meta-cognitive instruction improve students problem-solving skills?" (Even the softer "what if" or "how can I" questions end up in the same place; the components are either unarticulated or to be discovered and named later.) As with the interpretive examples above, teachers come to these questions from some knowledge of theory and concepts in the literature. And answering these questions well requires some attention to experimental design.

So, it is too simple to equate teacher research with qualitative research. Likewise, it is too simple to say that the intent is for local understanding and action. One danger is in the seductive implication that lack of rigor is OK. For Richardson (1994), for example, formal research must follow the canons of the research community, while practical inquiry follows other norms. But, as she cites, these standards of evidence and logic have not been worked out well. House et al (1989) call for an examination of how people draw conclusions from data in their own situations. Fenstermacher (1994) presents an in-depth review of the philosophical considerations behind knowledge claims in various traditions of research on teaching.

Moreover, teacher research is not kept local. Educators are increasingly sharing their studies with each other. In California's Elementary Alliance, for example, members were encouraged to conduct action research and share it across the network so that they could help each other learn about the intricacies of a meaning-centered curriculum and also so that they could document their successes for a larger audience. This need to use data in a political arena is often acknowledged by action researchers, and even given as a reason why teachers should do research. If we in the profession don't take charge of the data, then our argument is

weakened, and we are at the mercy of those who do own the data. (If knowledge is power, then claiming knowledge gives you power.)

In sum, these arguments may point to the essential connection between data and theory in action research as well as more formal research. Not only does the theoretical knowledge base in the literature generally inform any conceptualization and interpretation in the inquiry process, but also we may be misled or poorly served unless we see that inquiry often generates what amounts to propositional knowledge.

This analysis of teacher research has centered around the relationship between data and theory–a critical connection, as we have seen. But the discussion corner of the triangle must also be addressed. Discussion is generally seen as supportive to the research process, not central to the making of meaning as it was in case methods on PAL. But it is present and used in a variety of ways. In the opening description of teacher research, a stripped-down core model was presented–one in which an individual teacher conducts inquiry around his or her individual concerns. While this certainly happens, it is a very hard enterprise for an isolated individual to sustain. Even when the research project is an individual one, teachers generally meet in some kind of a support group. In Life Lab, for instance, the whole group met five days for training and guidance in the research process, and then met additionally in school groups. This support is seen as invaluable, even the highlight of the process. Complex Instruction teachers, for example, engaged in extended discussion of each others' data and interpretations at their final joint session, and commented that this discussion really enhanced their insight and understanding.

Sagor extends this further and has participants come in groups or teams from a school. Generally they select an area of focus as a team, something everyone can be interested in and contribute to. This way they can provide collegial support for each other at the school site between training sessions and even conduct the research as collaborative inquiry. In this situation, discussion is central to the ongoing process and contributes to the development of meaning. Sagor's long-term goal is to make action research part of the culture of the school.

Analysis of Examples

Up to this point, we have been talking generally about the processes involved in case methods, or PAL, or teacher research. In this last section, we want to bring the focus to specific examples of what goes on. Not only may these examples make the processes

themselves more understandable, they also provide a kind of data within which we can look for instances of the concepts and issues that have arisen in our analysis.

The examples are presented in two ways. Here in the text, set off in Arial type, we present a summary course of events in the math case methods project. This summary is a composite picture based on the reflections and writing of Barnett and several participating teachers. It centers around the issue of manipulatives and how they can be used in the teaching and learning of fractions. Following the discussion of this math case storyline, we discuss four synopses of individual teacher action research projects, which are presented in Appendix A.

Math manipulatives. The synopsis story is presented first, followed by discussion.

A group of teachers met with a facilitator 6 or 8 times a year, for several years, to discuss math cases. These cases were written by teachers and describe incidents of teaching and learning about fractions, ration, decimals and percent. They include samples of student work. They center on lessons that did not go well, puzzles or concerns.

One teacher, Sharon Friedman, describes what she expected to get out of the process when she started out:

> "When I first participated in a math case discussion, I thought that I would be examining instructional practice. I would share what I do, and hear about alternatives, which would lead to better informed decisions for my mathematics program. I was right, except for my understanding of what it meant to 'examine' instructional practice. I quickly learned that the 'examination' entailed more than merely acquainting myself with various instructional methods. Through the discussions, we looked deeply into the way instructional practice influenced and responded to student thinking." (Barnett & Friedman, 1995, p. 3)

An early expectation of Barnett and her colleagues designing the project was that teachers would engage in problem solving:

> "When we began case discussions, one of our major goals was to help teachers become better analyzers, critical-thinkers, problem-solvers, and decision-makers. The process of discussing a case was viewed as one of narrowing down the alternatives to find the ones that held the most promise, even though there might be drawbacks with each alternatives. We expected teachers to leave the discussion feeling that they had determined a

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> reasonable solution or made a defensible decision." (Barnett & Tyson, 1993, p. 8)

But when pushed to examine alternatives closely, against the hard standard of student understanding, the world became radically more complex. Teachers are accustomed to looking for new strategies to try out, but there is an underlying expectation that something will work, if we just come upon the right thing. Somebody out there must have found it. If not a specific recipe, at least there must be reliable guidelines. The experience of the math case discussion participants radically altered this mindset.

The issue of manipulatives is illustrative, and comes up in several of their articles. Basically, early on, they decided that "nothing works!" Barnett describes how teachers "swung from thinking that manipulatives were magic, to thinking manipulatives were entirely worthless during the course of their early discussions" (Barnett & Friedman, 1995, p. 17). No doubt having been told to "use manipulatives," they were dismayed to realize the misconceptions and partial understandings that students displayed in the cases. Two discussions were particularly salient to all participants. One was a discussion in which teachers realized that students could use manipulatives in a mechanical way, without understanding, something they termed "rote manipulatives." Another was a session in which they talked through a number of alternatives and decided that "nothing works!"

So the experience of problem-solving was not as neat as deciding on the most promising possibility. But the consequences were profound and transforming.

Following the "nothing works" discussion, teachers continued the discussion on their own, and even into the next group session. It was, for them, a turning point (Barnett & Ramirez, 1994). They stopped looking to Barnett, as the expert, to validate their answers. Basically, they realized that nobody knew; there was no magic answer.

> "We had to grapple with it.....Each of us had evaluated the decimal teaching materials that we were using, and all of us were searching for something new.....We began to think that perhaps a combination of materials or approaches was a possibility. We really questioned our teaching and considered the difficult decisions we had to make. Everything has its tradeoffs, but what was really important to us? What did we feel comfortable trying out?" (Barnett & Ramirez, 1994, p. 4)

In a similar way, around "rote manipulatives," teachers came to be profoundly "unsettled." Not only was there no clear answer, they were unwilling to settle for a "defensible decision." They wanted to carry the search into the classroom, to see for themselves how students responded (a process that Barnett and Tyson, 1993, called "informed, strategic inquiry"). They realized that there could be no preordained solution, that the best they could do was try a particular approach, notice and analyze the students' thinking, and respond to the new difficulties that arose.

> For instance, one teacher traced a series of steps in her use of manipulatives in the classroom (Barnett & Friedman, 1995). She had tried a fraction kit, but noticed a limitation to the students' understanding. She tried a replacement unit, which used a geometry base, and found some advantages, but some content elements were left out. She tried a method shared by a case participant: using a definition of a fraction in each lesson. But the definition oversimplified in some ways that led to confusion later on. Looking ahead, the teacher planned to use a combination of these methods and to warn students that the definition would be changed somewhat once they got into the unit further.

What themes can be identified in this story of math manipulatives? How did the three corners of the triangle figure into the process? What forms of knowing were in evidence?

The process began, of course, with discussion of a number of cases. Friedman's comments identify distinct advantages to this representational form. Aspects of teaching and learning were, indeed, frozen in time, highlighted, brought to attention for group consideration. Interestingly, it's the students, their thinking, their experience, which tend to be lost in the onrush of action. Certainly, teachers are there working with students in the classroom every day. But Friedman was struck by her learning that the examination of practice meant examining the reactions of students.

But notice that cases, alone, were not enough. The teachers were not satisfied with deciding among alternatives on the basis of their discussion. Rather, they felt the need to go back to the classroom and try things out. They were drawn to reflection on, and in, action. This use of "informed, strategic inquiry" was one of the striking, early discoveries of the facilitators (Barnett & Tyson, 1993). They apparently looked differently at their classrooms as a result of the case discussions, but it was in the classroom that the ultimate learning came about.

The group discussion process also had profound impact beyond the strictly cognitive learning. Another striking feature of the story is the critical point at which the teachers themselves took ownership of the problem and the need to find better solutions. They became active agents. They felt that it was up to them. And they experienced this transformation as a group. Barnett has structured the process to build this kind of ownership, for example, by having

the group decide where to start the discussion, and how to move it along.[8] The discussion belongs to the group. But it seemed to take a series of discussions for this ownership to build. And it may be that it was also critically important to reach this knowledge impasse, to realize that no one had the answers, because it was their stance toward knowledge, itself, that changed profoundly.

The net result of these events was that the group became a community of learners. They worked together on the problem. They drew ideas from the group to try out in their individual classrooms, as with Friedman's use of the definition of fraction introduced by another group member. They tested and modified and reported back to the group. But they continued to rely on the structure and norms of the case discussion to carry them along.

And where is theory in this process? What had they understood previously about manipulatives and how did their understanding change? Clearly they had begun with a fairly simple notion of the value of manipulatives. And this may well be related to the kind of abstract generalization that comes from research. Cutting across the complexity, advocates may claim, even with research support, that use of manipulatives boosts student understanding. But how are teachers to take this generalization back into the particulars of practice? It's clearly not just any manipulatives, or even "the right one." Rather it is some combination, continually adjusted within the particular situation. And it is this complexity which the case process teaches.

Notice how close their new, differentiated understanding is to Spiro's cognitive flexibility. Friedman realizes that no one representation works perfectly and that a combination of them is needed. She uses a definition, but discovers how its oversimplification, helpful in the initial stages, comes to limit the students' thinking. She decides to use the definition, but warn the students that she will change it as they get to more advanced learning. Both their own understanding as teachers and what they present to students reflect greater differentiation, complexity, and interconnection.

One wonders if the same explicit acknowledgment of complexity could be made up front with teachers. That is, could something like Spiro's theory be presented to them as a framework for understanding teaching and learning? Or would it be useful, but better kept for a middle stage in their deliberations? Is it dangerous to present such theory too soon because it might

[8] Teachers also take an active role in the project as a whole. They help decide logistics, serve on advisory groups, and eventually become discussion facilitators.

interfere with the group grappling and discovery that "nothing works" which so powerfully affected their stance toward knowledge and inquiry? What are the tradeoffs here? And issues of timing? Is it one of those things that Bamberger (1991) describes as "can't be told," but can only be watched for and encouraged. In the narrative tradition, using showing not telling. But would the theory pull it together in a framework at some later stage in their understanding? Or not?

Teacher research. Let's hold the math case methods example, learnings and questions, in mind as we look at several examples of teacher research. The four teacher research reports in Appendix A are drawn from written research reports, and the format of the report, including headings, are preserved to help highlight the structure of the inquiry. The reports come from different sources:

The article by Pinkerton on brain-based learning techniques was published in *Teaching and Change*, the new journal from NEA that gives voice to teachers. Apparently, the project was done independently by the author. The setting was a senior high school. The author reports on a constructivist, brain-based approach to instruction that he developed, and its impact on both the students and himself.

The article by Gronke, *Exit the Eighties*, was published in an anthology from the CRESS Center at U.C. Davis. About ten years ago, CRESS began sponsoring and facilitating teacher research groups. Over time, teacher participants became facilitators for new groups, and CRESS's role became one of supporting the facilitators. They hold an annual conference and serve as a clearinghouse. Gronke would have conducted her study in middle schools while meeting once or twice a month after school in a teacher research group. A school counselor, Gronke investigated the students' different modes of non-verbal communication.

The study by Richards on motivating low-achieving students was cited by Anderson, Herr, and Nihlen (1994) in their text, *Studying your own school*. It was originally published in the *Peabody Journal of Education*. Anderson et al. chose it as an example of research in the classroom. Apparently this study was also done independently. Beginning from her frustration that "nothing works" in motivating "the bums in 8H," Richards develops a multi-faced intervention and, perhaps more importantly, makes the students co-investigators into motivation.

The Skehan-Marshall study was one of those carried out in the Life Lab project described earlier. She was one of several elementary school teachers who volunteered to join a group

investigating science teaching. The group had five days of training and also met with project staff in school groups. They had time together over the summer to write up their projects. Skehan-Marshall focused on the kinds of questions that she asked, and the link to students' work and problem-solving skills.

Further details about each of these projects are provided in the summaries in Appendix A. What we want to do here is look across the projects, as a diverse but representative set of examples, and examine their features as reflective professional development. What about the issues of data and theory raised earlier? The interaction of different forms of knowing? The kind of personal involvement and agency that featured so strongly in the math case example discussed above? The nature of their understanding of teaching-learning processes?

To make it easier to address these questions, Table 1 lays out the four articles against some of these key features. Cell entries are short references to relevant aspects of each case.

For example, "story" refers to narrative aspects of the reports. Certainly, out of the context of case methods, there is no connection to written cases. They do not even report being influenced by stories told by others, or narrative accounts of practice. But they do, all of them, frame their own reports as stories, in several ways. They write the accounts in the first person ("this is what I did") rather than as third-person objective accounts; they are richly present as characters in the account, in terms of thoughts and feelings, as well as actions.

They also tend to give a personal rationale for how they came to the study, and it is this rationale which is noted in the table row for "story." They tell about how they came to be puzzled by something. Skehan-Marshall reports a critical event, when some former students came by and, upon probing, recalled little of a unit she had spent a lot of time on. Pinkerton describes how he tested out theoretical ideas against recollections from his personal experience, for instance, that he didn't really understand physics until he came to teach it. Thus, we come to the project in terms of the person's life history.

These research accounts also have a narrative plot structure. Research is primarily a problem-solving process, with dramatic tension and attempts at resolution. But here the research form also shows up, and the result is a kind of compromise. These folks state research questions. They collect data in systematic ways. They draw conclusions (although these are sometimes beyond the data). They provide us with less detail than a pure narrative might about the context and specific events. But there is a kind of narrative frame around the research.

	Pinkerton: Brain-based	**Gronke: Exit 80's**	**Richards: Motivate bums**	**Skehan-Marshall: Questioning**
Story	evidence from life stories	ongoing journaling	"nothing works"	"students drop by" critical event
Theory	read articles; needed brain-based rationale	quote from article "clicked," focused inquiry	Maslow hierarchy; motivation theory	Blosser quote; Thoughtful Ed. framework; other reading re science as process
Action	whole program developed and tested	used expanded communication channels she discovered	various interventions	taught framework to kids; some lessons to address gaps
Question form	What if I..... try this?	How do they.... communicate?	How can I..... motivate students?	If.....then: How do my questions influence students?
Data/ research	Outcome measures	Discussion; interviews	Journal; grades; tape recording; shadowing; discussion;	Questions recorded by several methods
Agency	sense of efficacy		I → we	personal inquiry as driving force
Complex-ity	multi-faceted program	many forms of communication	multiple interventions	need to see total picture; science process instruction plus questions

So narrative elements are clearly present. But theory is also prominent; more explicitly so than in the math case methods work. Each of the four authors cites specific reading which strongly influenced their research. Pinkerton talks about how readings on constructivism stuck a cord; but he needed something more, and found it in theories of brain-based learning, on which he based his model. Gronke talks about how a quote from her reading helped her take a general

concern and frame it into a specific question. Richards not only drew on readings about motivation but even used them to design an instructional unit for students.

Their use of theory seems close to Schön's "reframing." That is, they think about practice and frame problems in specific terms shaped by their reading. In Skehan-Marshall, we even see repeated reframing. She uses the Thoughtful Education framework to guide her study of questioning, which itself was initiated in part by a quote focusing on questions. But her continued reading (presumably along with her ongoing experience) led her to a larger reframing which encompassed both process science and the role of questions.

Action is also woven through. Here we can distinguish between Gronke and the others. Gronke conducts an interpretive study focused on understanding the students and how they communicate. She does report actions that followed from her understanding, but they are secondary to the intent simply to understand the students better. In contrast, each of the other three studies was focused on the action itself, and its consequences. Although, as the form of their questions show, they came at the action in different ways. Notice that although they all implicitly include students, only Skehan-Marshall has framed a question that explicitly highlights the interaction between specific teacher actions and student responses. She may have come to this from her group's use of Sagor's problem framing and graphic mapping process.

In general, this variability is reminiscent of the various action research spirals that theorists have drawn. In these, action and inquiry continually loop, and one can enter the spiral at different points. New understandings lead to new actions and new questions. Several of the studies have this flavor.

One issue to address is how this kind of action research spiraling relates to Schön's reflection on and in action. Just as we have seen above that the narrative flavor of the report is tempered by the research elements, which lead to increased attention to such features as data collection and analysis, and a kind of standard structure of elements at that, these reports seem to contain a different kind of inquiry from Schön's, in some ways. Again, the biggest difference seems to be systematic data collection and analysis. While Schön (1991), and those who draw on his work (Russell & Munby, 1991) seem to emphasis a kind of organic testing things out in practice, as the situation "talks back," these research-based approaches place greater emphasis on systematic data collection and interpretation. This brings a level of abstraction to the work. And, in fact, one can see evidence of both processes occurring simultaneously, as authors

struggle some with what they know and how they can present the case. Pinkerton, for instance, frames the research as focused on summative outcomes, but slips in comments such as "I have found that it is very important to give the listener sample questions." Gronke ends her report with a section titled "What I can't help thinking even if I can't prove it scientifically." As we move ahead, it will be important to look at the advantages and disadvantages to these forms of learning, what logic they employ, and how they are interrelated.

Finally, brief comments need to be made about both the "agency" and the "complexity" rows. While these reports may not contain the type of epiphany experience by the math case teachers, there is still clear evidence of these teacher's personal involvement, and impact on them at a personal level. In part, this relates to (or could even be encouraged by) the nature of their reports as personal experience narratives. Beyond this, it is clear that they are engaged in this process because of real personal concerns. And their sense of their role, their orientation as educators, changes in several instances. Pinkerton's can perhaps best be expressed as an enhanced sense of efficacy–he feels more competent and professional. This is a common response to engaging in action research. One teacher, for instance, described a shift from seeing something as a problem to seeing it as a project. Skehan-Marshall expresses something similar, but with a clear description of shift in orientation. We repeat her quote:

> I think that if I spend more time doing this kind of critical reflection it would be the driving force behind my curriculum, which is how it should be, instead of letting the curriculum drive me, which is the way it is.

For Richards, these shifts are presumably present, but there is another striking shift as well–this one in her relationship to students. (Gronke also echoes this.) Richards started out looking for what she could do to motivate "them." Although she began with this action focus, she also did some interpretive work. In particular, she shadowed her students and got a sense of the failure they experienced over the course of the day. Perhaps because of this, she opened the inquiry up to them and involved them explicitly in the investigation. In the end, her framing was around herself and the students as "we had a common understanding..."

Lastly, what about the complexity and differentiation with which they view practice. Here there is acknowledgment of complexity, even an increasingly differentiated view, but generally at a different level from the math case work. Certainly there is nothing quite like the shifts in understanding of representation and use of manipulatives, possibly because there was

not the same intense long-term scrutiny of detailed specifics of practice and student work. The closest is Gronke's study of forms of communication, and this was an interpretive, descriptive study in which she documented the richness and variety in students' forms of communication. For the other three, the complexity seems to be more at a program level. They developed more comprehensive approaches, tried numerous interventions, pulled more elements into their theoretical frameworks. Perhaps this focus is in keeping with the somewhat abstract nature of the research process, as mentioned above.

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APPENDIX A

EXAMPLES OF TEACHER RESEARCH

Using Brain-Based Learning Techniques in High School Science
Pinkerton, 1994

Goal	*I wanted to know if I could create and implement a year-long, brain-based curriculum. And I wanted to know what the results would be. I wanted to change my approach to teaching to maximize student intellectual growth.*
Starting point	*I read a journal article about constructivism which began a cascade of events in my life*.....it fit with evidence from my own experience as a learner (e.g. didn't really have a deep understanding of physics until had to teach it) and observing my students, but *constructivism seemed very theoretical to me. I still needed a more "total person" reason to change my way of teaching. The work of Hart and the Caines helped me realize that if I wanted to improve my students' learning, I had better study the primary organ of learning—the brain*.....specific concepts and examples from experience follow
What I did	Extensive description of instructional program--activities, projects, menu grading system, use of themes
Findings	a) two physics teachers, 25-item test administered after one semester, for 8 years (did brain-based last four) -- no difference (didn't lose on traditional, even though less lecturing, coverage) b) comments by former students: e.g. *"You taught me how to control my own situation and accomplish anything that I want to. I will carry this with me into the future. Thanks for all the physics. I'll see it every day and will be able to explain it."* see also others, data for below c) also embedded tidbits, e.g. *"I have found that it is very important to give the listener sample questions."*
Conclusions	a) *Brain based learning had three major effects on my students. 1) they learned that learning takes place in their minds when they are actively engaged in an intellectual struggle.....they experience a sense of empowerment about their learning; 2) my students learned that grades do not depend on luck but rather on what they can demonstrate about their knowledge.....3) they learned that knowing how we think helps us work.* b) emotions are important....students prefer to have a choice c) *I found a positive student response to these brain-based teaching methods. But for me, the most compelling evaluation of this effort is a personal one. I have never felt as good about teaching! When I sit with a student or a team of students and discuss a physical phenomenon, I feel most like a teacher*..... (see remainer)

A Teacher's Action research study: The "Bums" of 8H (A Humanistic view of motivational strategies with low achievers.)
Richards, 1989 (as summarized by Anderson, Herr, and Nihlen, 1994)

Initial Motivation	*Every year I ask myself the same question, "How am I going to motivate a group of students who do not want to learn?" I employ many strategies, trying a new one or two every now and then, but none has ever been so effective that other students came knocking at my door for the "answer."*
Broadens Original Question to Research Questions	*What behavior must I exhibit/model to elicit an interested response at the onset of the class; how can I maintain that interest; and finally how can I get students to self-initiate verbal or written performance? What mode of interaction best facilitates motivation to achieve objectives? And what is it that occurs in highly motivational situations? I wanted to determine what environmental factors in the classroom might influence motivation, and what types of rewards are effective.*
Data Collection Methods	daily journal (had kept one before but now focused on "bums"; tape recordings of class activities; student interviews and questionnaires also, launched study by shadowing 8H as it proceeded through its day...saw cumulative pattern of failure
Initial Action	read research proposal to the class, invited them to participate, to communicate with her; forged partnership with students
Interventions	several specific interventions reported: notes home, bulletin board with progress in participation, list of extrinsic motivators (surprised at priorities kids set: teaching resources #1)
Outside Readings	other interventions drawn from literature: Maslow's hierarchy -- need for acceptance -- shows importance of teacher caring; did content unit with students based on motivation theory
Results	a) documented many positive changes in day-to-day behavior; b) grades listed as prime motivator by students; "only 4 of 26 students had lower grades than previous marking period in her class"; but overall grades were up for 5 students, same for 9, down for 12; overall results disappointing, students say because other teachers don't care, use worksheets
Conclusions	*I can explain why the students' grades in my classroom improved in four weeks. We had a common understanding that getting good grades was important; we were interested in the content of the lesson; we valued each other's ideas; we were working and learning together. This interchange of teaching and learning was the most valuable lesson to be learned.....I had been mistaken about the students' potential because of their appearance.*

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Exit the Eighties
Gronke, 1988

Initial Journal Entry	*Watched the* (middle school) *kids....Such energy. A whole other life around friends, groups, and the opposite sex. Closed to me. Impenetrable. Can easily misread.....Then how can I reach them? Teach them any better?.....Overwhelmed with how much I don't really know about these people.*
How I Got Started (and framed a research question)	*I began to piece together this November puzzle in February because of a quote that stayed with me* about reduction in verbal skills because of nonverbal communication.....*I now had a question - What ways were my students using to communicate?*
What I Did	lucky timing - half of each eighth grade class in Career Center for three days, then switch - 12 to 17 in a circle - read quote and asked question....obvious (notes, telephone)....then probed for others...got "looks" etc.....had them write and got detailed descriptions asked why they write notes, have so many ways of communicating.....got many different answers.....follow up with individual interviews typed up and categorized data on looks and moves.....gave it to kids to read and they were interested, added some new ones.....but were uninterested in data about why they have so many ways of communicating
How I Changed	a) because students had opened up and told personal stories in the sessions, they were more likely to approach her with problems; b) students said they liked teacher with a lot of looks, so she uses more; c) hall duty more enjoyable because she can read looks and moves d) noticed quotes about communication in outside reading, workshops
What Others Said	Two teachers shared implications: use of notes in curriculum activity, intent to provide more family feeling in the classroom
What I Can't Help Thinking Even if I Can't Prove It Scientifically	*What I found out made me realize how much my students supported each other.*.....also realized that students are reading TV, learning looks and moves; one student *agreed with me that ads are like flirting training films*.....sexual content of notes made teacher uncomfortable: "it's the 80's" refrain of students when explaining why they have so many ways to communicate interpreted through elaboration of a student's line: *It's a big mind (and sometimes body) game. And they're playing younger and younger.*

It's All in the Question (Or is It?)
Skehan-Marshall, 1994

Questioning Techniques as a Focus	Former students dropped by. When questioned, they remembered little of a unit on colonization of America. *Why was I teaching if my students weren't learning? What skills were they taking with them?* Focus on questioning came from article by Patricia Blosser; quote: *"If you feel that one of your most important contributions to your students is providing them with the opportunity to learn to use process skills, to investigate and identify problems, and to develop methods for possible solutions, you will open up your questioning and give your students the opportunity to think."* Workshop by Silver on Thoughtful Education provided a framework for looking at four quadrants of questioning: mastery, understanding, involvement, and synthesis.
Problem Statement	*I believe that students in my second grade are not grasping science concepts in part because I don't have a good understanding of how to ask effective science questions. The statement led to the following questions:* * *How does student work change as my questioning changes?* * *Will students be able to internalize the process of questioning and begin to use it as a part of their thinking process?*
The Plan	Plan to tape record lessons to get sampling of teacher and student questions and analyze questions into four quadrants. See where gaps are and build lessons to address those gaps. See if children are able to start asking themselves meaningful questions in order to solve problems.
Data on Questioning	Collected samples of questions through several methods -- tape recording, volunteer recorder, and recording the questions herself -- no method perfect. Collected samples from several settings: teacher questions in science lessons; student questions during sharing, reading and science. Found out that half her own questions were for Understanding, none required Synthesis (application to new concept or situation). This was surprising; she thought most of her questions would be mastery. Found out that student questions during sharing followed a kind of script at the mastery level; decided that students did this to make it safer for one another. Questions during reading, when group was smaller and questions were to a fictitious character, were richer and more varied. Overall, most student questions were in the Involvement quadrant (personal viewpoint); none were Synthesis.
Building Lessons	Time ran short. Some things were tried. Taught categories of questions in Thoughtful Ed. model; used a bulletin board to remind students of types of questions. Deliberately asked synthesis questions in a lesson following a zoo trip; students responded enthusiastically.
Conclusions	*How does student work change as my questioning changes?* Can't tell yet. Wonder how to separate effects of teaching from developmental stages.

Will students be able to internalize the process of questioning...?
Thoughtful Ed. model may not be developmentally appropriate for second graders. Hard for them to ask Understanding/Synthesis questions. Need to try different models.

Further reading led her to broaden focus from questioning to total picture of how she teaches science. Realized that she wanted science to be "familiar" like reading and math; but science needs to be more open-ended and exploratory.

Impact on Self

I think that if I spend more time doing this kind of critical reflection it would be the driving force behind my curriculum, which is how it should be, instead of letting the curriculum drive me, which is the way it is.

Possible Next Steps

Could look at science process skills, how students learn them, where questioning fits in.

Using the info I have gathered I plan to:
1. Use Thoughtful Ed. model in cooperative groups.
2. Include parents in the study; encourage them to use questions.
3. Structure homework to include Thoughtful Ed. model.
4. Investigate other models of questioning that may be more accessible to children when they ask themselves questions to solve problems.

Extension Studies
- Do a case study using Teacher Expectation Student Achievement (TESA) model, which uses questioning
- Include a gender analysis. Is there similar and equitable questioning from both boys and girls?

APPENDIX B

ANNOTATED BIBLIOGRAPHY

Annotated Bibliography:
Professional Development Models and Reflective Thinking

Adler, S. (1994). Reflective practice and teacher education. In E. W. Ross (Ed.), *Reflective practice in social studies* (Bulletin No. 88). Washington, DC: National Council for the Social Studies.

Recognizes that "Practitioners often argue that teacher education is too theoretical, too distant from the real world of the classrooms. Consistently, it is the students' teaching experience, not the findings of researchers, that has been seen by practitioners as the most important, perhaps even the only important, element of preservice education" (p. 51). Yet, "Theory and knowledge about learning, schooling, and teaching gained through research can and should inform practice. The challenge for teacher education has been to bring together theory and practice, the worlds of research and practice. The charge to teacher educators is that of enabling teachers to bring appropriate knowledge and experience to bear on their classroom practice" (p. 52). Compares the Cruikshank model (which focuses on teachers' choices of teaching strategies--a technical and practical focus), the Schön model (which focuses on reflection in action; i.e., teachers who can think while acting), and the Zeichner model (which views reflection as critical inquiry that goes beyond mere technique and immediate situations as in the other two models).

Andrews, S. V., & Smith, P. G. (1994, February). *Multiple levels of collaboration in professional development schools: A continuum of professional development.* Paper presented at the annual meeting of the American Association of Colleges for Teacher Education, Chicago, IL.

Focuses on university-public school partnerships. Views partnerships as "a continuum of staff development which can be fostered throughout strategies and structures in the university and public schools" (p. 2). Finds that "group processes for the generation of ideas, the solving of problems, and the learning of information are valued and useful" (p. 9).

Berkey, R., Curtis, T., Minnick, F., Zietlow, K., Campbell, D., & Kirshner, B. W. (1990). Collaborating for reflective practice: Voices of teachers, administrators, and researchers. *Education and Urban Society, 22(2),* 204-232.

Discusses four-year combined research and staff development project "designed to bridge the gap between research and practice, by promoting reflection as a way for teachers to direct their own professional development" (p. 204). Presents each participant's reflections and necessary elements for reflection to work: 1) participation must be voluntary; 2) participants must have a "deeply held respect for teachers' knowledge and teachers' ability to direct their own growth"; 3) "teachers sand principals should initiate and direct the project focus and initiate any changes made in their practice" (p. 230). Also identifies elements required for facilitating reflection.

Brody, C. M. (1994). Using co-teaching to promote reflective practice. *Journal of Staff Development, 15(3),* 32-36.

Discusses the mutually symbiotic relationship of co-teaching and reflective practice in professional development (i.e., how they enhance each other). Provides recommendations to staff developers accordingly.

Darling-Hammond, L. (1994, February). *Standards for teachers. 34th Charles W. Hunt Memorial Lecture.* Paper presented at the 46th annual meeting of the American Association of Colleges for Teacher Education, Chicago, IL.

Notes failure of top down approach in which "teachers receiv[e] knowledge that trickles down from the top of the system in the form of directives, memos, and 'teacher-proof' curriculum guides" (p. 7). Argues that "standards are useful only to the extent that teachers can use them to build their own knowledge and understanding of what helps students learn" (p. 10). Moreover, teachers must learn in the way that we hope they will teach and must be given professional control over their occupation. States that ". . . it is in the use of . . . standards and reflecting on one's own practice that they [the standards] come alive and become useful for learning, not just for assessment" (p. 30).

Darling-Hammond, L., & McLaughlin, M. (1995). Policies that support professional development in an era of reform. *Phi Delta Kappan, 76(8),* 597-604.

Observes that "capacity-building policies view knowledge as constructed by and with practitioners for use in their own contexts, rather than as something conveyed by policy makers as a single solution for top-down implementation" (p. 598). Advises that new structures and institutional arrangements for professional development are necessary for these capacity-building policies to be effective. Specifically, "Teachers learn by doing, reading, and reflecting (just as students do); by collaborating with other teachers; by looking closely at students and their work; and by sharing what they see. This kind of learning enables teachers to make the leap from theory to accomplished practice. In addition to a powerful base of theoretical knowledge, such learning requires settings that support teacher inquiry and collaboration and strategies grounded in teachers' questions and concerns" (p. 598). Provides specific recommendations accordingly. Also discusses the policy context in support of professional development and policy guidelines for professional development.

Diss, R. E., Buckley, P. K., & Pfau, N. D. (1992). Interactive reflective teaching: A school-college collaborative model for professional development. *Journal of Staff Development, 13(2),* 28-31.

Overview of Emory & Henry College collaboration with public school districts of Washington and Smyth Counties, Virginia to improve field experiences for preservice teachers through development of the Interactive Reflective Teaching Model (which also provided professional development for participating inservice teachers). Participants included classroom teachers, principals, teacher education students, and college faculty. Teachers found the program to foster professional growth by "(a) increasing their awareness of the need to think critically and

creatively about decision making; (b) broadening their teaching repertoires; (c) providing confirmation of their effective teaching methods; and (d) reinforcing the value of ongoing reflective thinking" (p. 30). Article provides implications for staff developers and strategies for implementing the model.

Gall, M. D., & Vojtek, R. O. (1994). *Planning for effective staff development: Six research-based models.* Washington, DC: OERI.

Discusses 8 objectives of staff development (teacher-, student-, curriculum-, and school-centered); teacher-centered objectives include awareness of new research and practices and "Development of Reflective Decisionmaking" (p. 12). Refers to J. Shulman's (1991) case study method and peer coaching as different types of stimulus for reflection. The six staff development models include: 1) "Expert-Presenter Model" (which is generally not considered effective in and of itself--rather, it must be coupled to another model); 2) "Clinical-Supervision Model"; 3) "Skill-Training Model"; 4) "Action-Research Model"; 5) "Organization-Development Model"; and 6) "Change-Process Model." [For key features of each model, please refer to photocopied pages labeled "Gall & Vojtek."]

Glatthorn, A. A. (1987). Cooperative professional development: Peer-centered options for teacher growth. *Educational Leadership, 45(3),* 31-35.

Defines cooperative professional development as "a process by which small teams of teachers work together, using a variety of methods and structures, for their own professional growth" (p. 31). At least five different ways of working together exist: 1) professional dialogue; 2) curriculum development; 3) peer supervision; 4) peer coaching; and 5) action research. Professional dialogue is marked by three stages: 1) emphasis on external knowledge; 2) emphasis on personal knowledge; and 3) implications of the discussion about external and personal knowledge for teaching. Concludes with brief discussion of implementing cooperative professional development.

Guskey, T. R., & Huberman, M. (Eds.). (1995). *Professional development in education: New paradigms and practices.* New York: Teachers College Press.

Claims that "what passes for 'professional development' in schools is a joke . . . it's pedagogically naive, a demeaning exercise that often leaves its participants more cynical than before" (p. vii). Yet possibilities for improvement exist, as this book demonstrates. Sections of the book include: The Role of Personal Bases and Characteristics; Social-Psychological and Institutional Factors; Phases, Models, and Requisite Supports; The Present and Future of Professionalism; and the Diversities of Professional Development.

Herndon, K., & Fauske, J. (1994, April). *Facilitating teachers' professional growth through action research.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Argues that "Encouraging best practice means encouraging reflection about teaching" (p. 1) and wonders whether doing so will affect preservice teachers. Action research appears to increase teachers' levels of reflection and is "more widely accepted as a meaningful form of inquiry in the classroom context" (p. 19).

Jalongo, M. R. (1992). Teachers' stories: Our ways of knowing. *Educational Leadership, 49(7),* 68-69, 71-73.

Discusses use of stories to enhance professional development by providing insight to educators about their own practice and by contributing to the knowledge base about teaching. Observes that unlike other social sciences, "education alone remains reluctant to share and value the stories that give form and meaning" to educators (p. 68). Additionally, "Professional educators' common sense derives, not from rote memorization of many precise pieces of information, but from the stories used to make all those bits of information cohesive and relevant" (p. 69). Concludes that "personal narratives can reveal the nurturing dimension of the teaching role, characterize important changes in our professional lives, and encourage more reflective practice . . .Personal narratives are not superfluous features of teachers' lives; they are basic to our professional growth" (p. 72).

Johnson, B. (1993, March). Teacher-as-researcher. *ERIC Digest.* Washington, DC: OERI.

Brief overview of teacher research as rooted in action research: a "deliberate, solution-oriented investigation that is group or personally owned and conducted" (p. 1). Action research is often collaborative and often a professional development strategy by which practitioners are more aware of the "options and possibilities for change" (p. 1).

Kelsay, K. L. (1992, April). *A qualitative study of reflective thinking.* Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Presentation of a qualitative study on reflective thinking that found: "reflection plays an important role in teaching" (p. 20). And "some teachers, at least, are reflective practitioners who engage in a type of problem solving as they seek to integrate their value beliefs, theoretical knowledge, craft knowledge, and experience with the context in which they teach" (p. 21).

Lasley, T. J. (1992). Promoting teacher reflection. *Journal of Staff Development, 13(1),* 24-29.

Claims that teachers generally fall into three stages of pedagogical functioning which correspond to three stages of reflection. Psychological profiles of teachers (following Person's archetypes: orphan, martyr, warrior, wanderer, magician) must be considered in order to ensure the success of professional development based on reflective practice.

Lieberman, A. (1989). Collaborative research: Working with, not working on... *Educational Leadership, 43(5),* 28-32.

Provides overview of Stephen Corey's early work on self-learning (the roots of reflective practice). Discusses 1976 Tikunoff, Ward and Griffin study on interactive research and the later study by Griffin, Lieberman, and Noto in 1982. Concludes that "collaborative research has great potential for producing knowledge when teachers define the problems of their work" (p. 32).

Lieberman, A. (1995). Practices that support teacher development: Transforming conceptions of professional learning. *Phi Delta Kappan, 76(8),* 591-596.

Discusses evolution of PD from "direct teaching" (akin to the "linear process" noted by Filby) to current theory that suggests that "people learn best through active involvement and through thinking about and becoming articulate about what they have learned" (p. 592). Argues that most inservice training and staff development of teachers has been unconnected to classroom life and has been marked by abstract ideas--new approach to PD "yokes student-centered pedagogy and opportunities for teacher leaning" (p. 592). This shift implies that "teacher development opportunities must become integral to the restructuring of schools" (p. 592). Teachers are now "actively involved in decisions about the substance, the process, and the organizational supports for learning in school" (p. 593). Presents ways to engage in this new PD: "by building new roles (e.g., teacher leader, peer coach, teacher researcher)"; "by creating new structures (e.g., problem-solving groups, decision-making teams)"; "by working on new tasks (e.g., journal and proposal writing, learning about assessment, creating standards, analyzing or writing case studies of practice)"; and "by creating a culture of inquiry, wherein professional learning is expected, sought after, and an ongoing part of teaching and school life" (p. 593). Doing so "broadens the agenda for thought and action" (p. 593). Professional learning can take place within the school (examples provided in article) and outside of the school through networks, collaborative, coalitions, and partnerships (examples are provided in article).

Lieberman, A., & Miller, L. (1990). Teacher development in professional practice schools. *Teachers College Record, 92(1),* 105-122.

Overview of "professional development schools . . . as a promising model for connecting school renewal and the reform of teacher education" (p. 105). Focuses on how these schools can provide continuing professional development for inservice teachers. Inservice education has become "synonymous with training and implies a deficit model of education" (p. 106) in which teachers are considered passive recipients of knowledge. In contrast, the authors view teachers as a "'reflective practitioner,' someone who has a tacit knowledge base who then builds on that knowledge base through ongoing inquiry and analysis, continually rethinking and reevaluating clues and practices" (p. 107). Presents five elements requisite to building a culture supportive of teacher inquiry: "(1) norms of colleagueship, openness, and trust; (2) opportunities and time for disciplined inquiry; (3) teacher learning of content in context; (4) reconstruction of leadership roles; and (5) networks, collaborations, and coalitions" (p. 107). Concludes that professional practice schools "can provide a variety of learning environments for students as active learners, and a workplace environment for teachers that is rich in continuous inquiry, peer discussion, and opportunities for adult learning" (p. 121) thus providing the requisite elements listed above.

Lieberman, A., & Miller, L. (1991). *Staff development for education in the '90s: New demands, new realities, new perspectives.* New York: Teachers College Press.

Highlights contemporary work on professional development. Professional development should not be viewed as an isolated workshop; rather, it should be viewed as a means of working with teachers over time. Importance is placed on "understanding . . . the teacher as a learner, leader, and colleague in helping shape a professional community" (p. vii). Of particular interest, Part II includes chapters on "Using Teacher Cases for Reflection and Enhanced Understanding" and "Action Research: The Missing Link in the Creation of Schools as Centers of Inquiry."

Little, J. W. (1993). Teachers' professional development in a climate of educational reform. *Educational Evaluation and Policy Analysis, 15(2),* 129-151.

Argues that reform initiatives require a new conception of professional development and that "Emerging alternatives to the [traditional] training model, though small in scale, embody assumptions about teacher learning and the transformation of schooling that appear more fully compatible with the complex contexts of teaching" (p. 129). Discusses five streams of reform and their relation to professional development: reforms in subject matter teaching; reforms centered on equity; reforms in assessment practices; reforms in the social organization of schooling; and reforms in the professionalization of teaching. Presents four alternatives to the traditional training model that rest on a common claim: "that the most promising forms of professional development engage teachers in the pursuit of genuine questions, problems, and curiosities, over time, in ways that leave a mark on the perspectives, policy and practice" (p. 133). The alternatives are facilitated through: teacher collaboratives and other networks; subject matter associations; collaborations targeted at school reform; and special institutes and centers. Also discusses six principles for professional development.

Lytle, S., & McGuire, P. (1993). *Staff development at the crossroads.* Philadelphia, PA: National Center on Adult Literacy.

Viewing practitioners as "empty vessels" to be filled with knowledge (the "deficit model of education," p. 1) ignores the rich and varied experiences practitioners bring with them. In contrast, NCAL's 1991 Adult Literacy Practitioner Inquiry Project (ALPIP) focuses on practitioners' questions about their own practice as a form of staff development.

McLaughlin, M. W., & Marsh, D. D. (1990). Staff development and school change. In A. Lieberman (Ed.), *Schools as collaborative cultures: Creating the future now* (pp. 213-232). Bristol, PA: Falmer Press.

Discusses movement of staff development to center stage of reform; claims that "what we have now [in staff development] is ineffective and a waste of time" (p. 213). Summarizes results of RAND Change Agent study which found top down planning as resulting in indifferent implementation by teachers (implication being that "for teachers, the learning task is more like problem-solving than like mastering 'proven' procedures" p. 226).

Murphy, C. (1992). Study groups foster schoolwide learning. *Educational Leadership, 50(3),* 71-74.

Discusses use of study groups as a feature of school improvement in the Richmond County Schools in Augusta, Georgia. Provides three-pronged rationale for using study groups: "they help us implement curricular and instructional innovations, collaboratively plan school improvement, and study research on teaching and learning" (p. 71). Demonstrates how to organize study groups, how study groups operate, and lessons learned.

National Staff Development Council. (1994). *National Staff Development Council's standards for staff development: Study guide (Middle Level Edition).* Oxford, OH: Author.

A guide for individuals, groups, districts, or schools that outlines context, process, and content standards for implementing professional development. Asserts that the traditional form of staff development, "in which relatively passive participants were 'made aware' of the latest ideas regarding teaching and learning from so-called 'experts'" (p. 1) has been replaced by a process that "not only includes high-quality ongoing training programs with intensive follow up and support, but also other growth-promoting processes such as study groups, action research, and peer coaching . . . " (p. 1).

Osterman, K. F. (1990). Reflective practice: A new agenda for education. *Education and Urban Society, 22(2),* 133-152.

Discusses Schön and Argyris' conception of teachers as reflective practitioners; provides overview of reflective practice, its implications for professional development, and its implication for schools.

Osterman, K. F., & Kottkamp, R. B. (1993). *Reflective practice for educators: Improving schooling through professional development.* Newbury Park, CA: Corwin Press, Inc.

Explores the rationale for reflective practice, a professional development strategy aimed at behavioral change, and explains how reflective practice facilitates both individual and organizational change. Also contrasts reflective practice with traditional models and offers general guidelines for engaging in reflective practice. [Summary taken from ERIC abstract.]

Russell, T. L. (1985). Images of improving practice. *Teacher Education Quarterly, 12(3),* 16-22.

Compares three images of teachers in professional development: defective, effective, and reflective. Finds that "The issue is not one of abandoning research but of reframing the role of research in improving practice" (p. 19). That is, "The improvement of practice begins not with new research findings but with each teacher's existing practical knowledge–the knowledge implicit in a teacher's daily routines of practice" (p. 19). Viewing teachers as reflective "has the potential to generate profound improvement in the teacher preparation enterprise" (p. 21).

Sagor, R. (1992). *How to conduct collaborative action research.* Alexandria, VA: Association for Collaborative Action Research.

Argues that all professions have a knowledge base, including teaching, yet " . . . in all the professions except teaching, practitioners are also expected to interact with and contribute to the development of their profession's knowledge base" (p. 3). This top down approach is akin to that of blue collar work. Views collaborative action research as a way to foster the norms found in effective schools; disciplined inquiry is a way to improve one's own situation in collaboration with others (through dialog, etc.).

Schön, D. A. (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions.* San Francisco: Jossey-Bass.

Outlines process of "reflection-in action" by which a practitioner learns by doing. Fostering reflective practice involves active coaching by a master teacher, including giving students practice facing real problems, testing solutions, making mistakes, seeking help, and refining approaches. Illustrates how reflection-in-action works, what encourages it, and behavior or attributes that can prevent the development of reflectiveness. [Summary taken from ERIC abstract.]

Shulman, J. (Ed.). (1992). *Case methods in teacher education.* New York: Teachers College Press.

Conveys a range of uses for cases in teacher education; finds that "Cases . . . are helpful in teaching about subject matter, classroom management, inquiry and reflection on teaching, and knowledge traditionally conveyed in foundations courses" (p. vii). Intention of book is to demonstrate how to develop and use a variety of cases in preservice and inservice training as a way to bridge the gap between theory and practice.

Sparks, D., & Loucks-Horsley, S. (1989). Five models of staff development for teachers. *Journal of Staff Development, 10(4),* 40-57.

Defines staff development as "those processes that improve the job-related knowledge, skills, or attitudes of school employees" (p. 41). The five models of staff development presented are: 1) individually-guided staff development; 2) observation/assessment; 3) involvement in a development/improvement process; 4) training; and 5) inquiry. Provides underlying assumptions, theoretical and research underpinnings, phases of activity, and illustrations and outcomes for each.

Wellington, B. (1991). The promise of reflective practice. *Educational Leadership, 48(6),* 4-5.

Brief (two-page) overview of reflective practice; warns that "Information about reflective practice is not to be confused with the experience of reflective practice" (p. 5).

Williams, D. D. (1992, April). *Preparing teachers as naturalistic inquirers: Responding to the face of the other.* Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Discussion of teacher preparation; finds that "the process of involving student teachers and novice teachers as naturalistic inquirers works" (p. 10).

Wood, D. R. (1992). Teaching narratives: A source for faculty development and evaluation. *Harvard Educational Review, 62(4),* 535-550.

Describes a narrative-based teacher evaluation program. Argues that supervision models of evaluation ignore "the knowledge and experience of individual teachers, which . . . are the richest grounds for educative inquiry and improved practice" (p. 535). Provides words of caution when implementing a narrative-based evaluation program, yet concludes that overall, such a program better enhances professional development.

Zeichner, K. M. (1987). Preparing reflective teachers: An overview of instructional strategies which have been employed in preservice teacher education. *International Journal of Educational Research, 11(5),* 565-75.

Describes the most common approaches to preparing reflective teachers in preservice education "with an assessment of the empirical support which currently exists with regard to the efficacy of various approaches" (p. 565). Presents six major strategies for encouraging reflective practice (with details): "(1) action research; (2) ethnography; (3) writing; (4) supervisory approaches; (5) curriculum analysis and development; and (6) the methodology of 'reflective teaching'" (p. 568).

Zeichner, K. M., & Liston, D. P. (199X). Teaching student teachers to reflect. *Harvard Educational Review, 57(1),* 23-48.

Discusses goals and concepts of the University of Wisconsin's teacher preparation program with emphasis on its organizational structure and curricular plan. Argues that the conventional approach to preservice education (in which teachers are presented with a preexisting body of knowledge) "inhibits the self-directed growth of students teachers and thereby fails to promote their full professional development" (p. 23). The authors believe "that learning . . . is greater and deeper when teachers are encouraged to exercise their judgment about the content and processes of their work and to give some direction to the shape of schools as educational environments" (p. 24).